

a longitudinal body that is straight "which creates a dental arch widening when placed on an orthodontic appliance."

Lines 19- 21 in the detailed description of the present application are as follows: "In one embodiment, Figs. 1-4, the arch bar 1 is straight which widens the dental arch in the molar area when placed on the orthodontic appliance as shown in Fig. 3." Figs. 1 and 2 describe this concept. The best way to visualize this concept is to view the wire has elastic memory in its initial form, that form being a straight line, in the present case, as shown in Fig. 1. Merriam-Webster dictionary describes elastic as: "of a solid: capable of recovering size and shape after deformation". The wire of Fig. 1 is shown in Fig. 2 in a deformed state when attached to the orthodontic appliance wherein the wire is exerting pressure upon the teeth as it tries to return to its original straight position. Claims`1 has been amended as follows to clarify this:

Claim 1 In line 4 following ".... straight" which becomes curved when placed on the orthodontic appliance has been added; also added, following " .. dental arch widening" as the wire body tries to return to a straight configuration.

Additionally, claims 4, 22 and 28 recite the limitation "wire" in describing the accessory arch bar. There is insufficient antecedent basis for this limitation in the claim.

Claim 4. ~~Wire~~ has been deleted.

Claim 22. ~~Wire~~ has been deleted.

Claim 28. ~~Wire~~ has been deleted.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

I am responding with the following law concerning 102(b) in mind:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d

1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

MPEP 2131.01. Multiple references may be proper when extra cited references are cited to:

- (A) Prove the primary reference contains an "enabled disclosure";
- (B) Explain the meaning of the term used in the primary reference; or
- (C) Show that the characteristic not disclosed in the reference is inherent.

An orthodontic appliance consists of arch wires which produce forces resulting in movement of the teeth. The archwire forces are transmitted to the teeth via orthodontic tubes and brackets, primarily brackets mounted on the cheek side of the teeth, which are attached to the teeth by bonding or attached to metal rings which are in turn cemented to the teeth. The tubes are usually only used on the most posterior, or back teeth. The tubes and brackets are sized to receive orthodontic wires. A bracket, for example, contains a slot, shaped to receive an arch wire within the slot. Modernly, bracket slots are made .018" or .022" in size. This concept is critical because the present invention discloses an accessory arch bar which is attached to the brackets; but, is attached outside the bracket slot. The accessory wire coexists with the conventional arch wire.

2. Claims 1 and 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Teramoto (5,967,774). In re claim 1, Teramoto shows an arch bar comprising a metal wire longitudinal body having opposing longitudinal ends (11)

Teramoto does not disclose a single arch bar. Teramoto in Figs. 1, 2(a) and 2(b) discloses two guide wires 1, each with ends 11, and an orthodontic wire 2 connecting the two guide wires 1. Additionally included are springs 12 and tubes 13. The present invention discloses in Figs. 1, 2, 3, 4A, 4B, 5A, 5B, 5C, 6, 7, 8, 9, 10, 11, 12, 13A and 13B a single continuous archwire 1. Note in claims 1, 3, and 4 in the present invention the accessory arch bar is a singular wire as compared to Teramoto in claim 1. In Teramoto, claim 1, the dental assist appliance consists of a base shaft member 11 with a free end 11a and a forked end 11b and 11c, an elastic member 12, a slide member 13, a forked end and an orthodontic wire 2. Teramoto's claims do not anticipate each and every element of the claims in the present invention. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir.1987).

and a cross-sectional diameter (col 3, ln 41-43);

The sectional diameter referred to above refers to only the Y-shaped wire 11 section of the

guide wire 1. Refer to the rest of the sentence starting in line 39: "The Y-shaped wire.....". This sentence refers to Fig. 4(b) wherein the guide wire 1 is disclosed with a Y-shaped end 11. Fig. 4(b) referred to in the above sentence only discloses one section of three sections of the dental assist appliance as discussed above. The guide wire 1 must have a diameter sufficient to be firm. The orthodontic wire section 22 would require a diameter appropriate to fit in an orthodontic bracket 5 slot as disclosed in Fig. 2b(b). The conclusion is that the Y-shaped wire, the guide wire and the archwire each have differing diameters, unlike the present invention which discloses a single wire with the same diameter from one end to the other. Terramoto does not anticipate a single wire as claimed in the present invention. The single wire as disclosed in claim 1 of the present invention is neither expressly nor inherently disclosed in Terramoto. (*Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance (Figures 2-3);

Figs. 2-3 disclose three wires with a combined length equal to the length of an orthodontic archwire, unlike the present invention wherein the single accessory wire 1 equals the length of an archwire.

a straight longitudinal body (Figure 4);

Figs. 4(a) and 4(b) disclose the guide wire 1 which must be rigid to function. The wire is not designed to bend in use.

In claim 1 in the present invention, lines 3-7 : "a metal wire with a longitudinal body having opposing longitudinal ends, a cross-sectional diameter, and a longitudinal axis wherein the **longitudinal body is straight** which **creates a dental arch widening** when placed on an orthodontic appliance;". In orthodontic terms when a wire is bent straight an orthodontic wire retains an elastic memory of being straight. The wire described in claim 1 is "**straight**" and is deformed into the curve of the dental arch "**when placed upon an orthodontic appliance**" which creates a force within the wire, because it is elastic, to return to its original straight position; therefore, "**creates a widening of the dental arch**". The Terramoto straight wire does not exert a pressure upon the teeth as the straight wire in the present invention does. Terramoto does not show the identical invention as disclosed in claim 1 of the present invention. ("The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claim 1 has been amended to clarify the invention starting in line 4:

a metal wire with a longitudinal body having opposing longitudinal ends, a cross-sectional diameter, and a longitudinal axis wherein the longitudinal body is straight which becomes curved when placed on the orthodontic appliance which creates a dental arch widening as the wire longitudinal body tries to return to a straight configuration when placed on an orthodontic appliance;

tying means for attaching the accessory arch bar to an orthodontic appliance, wherein a wire ligature is used to attach the arch bar to an orthodontic bracket (col 4, In 39-43);

Col. 4, lines 39-43, is referring to tying "**the orthodontic wire 2**". The tying means would be similar to the tying means in the present invention. Referring to Col. 4, lines 31-32, "The orthodontic wire 2 is bent to suit the positions of the **front teeth 4** (See Fig. 2b)." Note in Fig. 2a the archwire engages only the front teeth 4 brackets 5. Compare this to Figs. 2, 3 and 6 of the present invention where the accessory wire 1 is **attached to all the brackets**.

Also note in Fig. 2a in Teramoto the archwire 22 is fully engaged within the bracket 5 slots. In comparison in the present invention in Figs. 2, 2A, 3, 3A and 6 the orthodontic bracket 10 contains a standard orthodontic archwire and the accessory archwire 1 piggybacks the archwire and is **outside the bracket slot**. Terramoto does not teach these limitations.

and a cross-sectional diameter in the range of 0.020 inches to 0.60 inches (col 3, In 41).

The range is similar; but, the above reference refers to the diameter of the guide wire 1 which does not by itself move teeth. The guide wire 1 only has a requirement to be firm. The wire in the present invention moves the teeth; therefore, the size wire relates to the amount of pressure placed upon the teeth.

In summary, Teramoto does not anticipate, for the above reasons, each and every element of claim 1. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

In re claim 3, Teramoto discloses the composition of the arch bar is comprised of metal compositions (col 3, In 33-34).

This is the same as the present invention; but, assuming claim 1 is allowable, claim 3 includes

all the limitations of claim 1 and is allowable (35 U.S.C. 112).

In re claim 4, Teramoto discloses the composition of the arch bar can be stainless steel (col 3, ln 33-34).

This is the same. Claim 4 includes all the limitations of independent claim 1; therefore, is allowable if claim 1 is allowable (35 U.S.C. 112).

3. Claim 7 is rejected under 35 U.S.C. 102(b) as being anticipated by Wool (4,424,033). Wool shows an arch bar comprising a metal wire with a longitudinal body having opposing longitudinal ends (Figure 1),

This is the same.

a cross-sectional diameter (Figure 3),

Fig. 3 discloses a round cross-sectional diameter as the present invention discloses. Note Fig. 4 discloses a rectangular cross-sectional diameter which the present invention does not claim or disclose.

and the longitudinal body is curved on a flat plane (Figure 1);

This is the same as one version of the present invention; but, note in the present invention drawings Figs. 1, 7, 9 and 11 the longitudinal body is not curved in a flat plane.

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance (Figure 7);

This is the same.

tying means for attaching the accessory arch bar to an orthodontic appliance, wherein a

wire ligature is used to attach the arch bar to an orthodontic bracket (column 4, lines 9-11);

This is the same.

and a cross-sectional diameter in the range of 0.020 inches to 0.60 inches (col 6, ln 25).

This is the range claimed in the present invention. This range does critically does not apply to Wool. In the present invention the accessory bar lies outside the bracket slot; therefore, the size of the bracket slot does not limit the size of the accessory wire. In Wool the wire **fits within the slot** as shown in Figs. 5, 6, 7, 8, 13, 14, 15 and 16. Col. 4, lines 7-9 state: "As shown in Fig. 5, posterior segment 14 of the archwire is **located in the rectangular slot** of a posterior tooth bracket 26". Col. 5, lines 28-29 state: "Segment 57 is **installed in a tapered edgewise slot of a bracket 55**". In col. 7, lines 53-54 state: "an archwire extending **through slots** of all said brackets," In Col. 6, lines 24-25 state: "cross-sections of the anterior segment is .022 inch". The height of an edgewise bracket slot is .022 inch which is the maximize size the Wool wire may be. The novelty of the present invention is the ability to use wires which exceed the size of the conventional orthodontic archwire which is limited by the bracket slot size which is .022 inch.

Wool does not expressly or inherently describe each and every element of claim 7. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Further dependent claim 7 includes all the limitations of independent claim 1 that it refers to. Assuming claim 1 is allowable claim 7 is allowable. (35 USC 112).

To further clarify claims 1, 7, 13 and 19 the following amendments have been made:

Claim 1 in line 1 followingorthodontic appliance by piggybacking on the labial side of an installed archwire.....

Claim 7 Amended the same as claim 1.

Claim 13 Amended the same as claim 1.

Claim 19 Amended the same as claim 1, also line 4formed ~~on~~ with a flat occlusal plane.....

4. Claims 13, 16, 19, 21-22, 25 and 27-28 are rejected under 35 U.S.C. 102(b) as being anticipated by White (6,431,861). In re claim 13, White discloses an arch bar attached to a fixed orthodontic appliance (Figure 3)

Figs. 3A and 3B disclose an archwire, not an arch bar, engaged within the slots of orthodontic brackets. A Dictionary of Dental Terms by Rich Masel defines archwire as "A metal wire which is attached to your brackets to move your teeth" and a dental bracket as "A metal or ceramic part that is glued onto a tooth and serves as a means of fastening the arch wire". The White archwire is sized to fit within a .022 inch slot per Col. 6, lines 2-3: "—diameter of between about 0.12" and 0.022". As discussed previously in the present invention the accessory archbar in the present invention is not enclosed within the bracket slot which allows much larger wires with greater strengths.

comprising a metal wire with a longitudinal body having opposing ends (Figure 1-2);

This is the same as the present invention.

a cross sectional diameter (col 6, ln 2-3);

Note in claim 7, line 7 of the White disclosure as is continued: ".....a cross- section and diameter between about 0.012" and 0.020". Note in claim 6, lines 2-3, White discloses: ".....a cross-sectional diameter of .0 20" to .060". White is not teaching or anticipating wires which exceed the size of an orthodontic bracket slot (.022").

and a longitudinal axis (Figure 1).

This is similar. In conclusion, White, for the above reasons, does not teach or suggest each and every element of claim 13. (*Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

It should be noted that applicant is claiming an article of manufacture and not the process of forming/making the device, accordingly, the manner in which the device is formed, i.e. forming the desired dental arch shape on a flat plane, is given little weight. *In re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974).

You must be referring to "...is curved on a flat plane..." in line 4. In general, orthodontic movement is accomplished using archwires. The easiest way to view the wire used by the orthodontist is that the wire starts as a straight wire. The orthodontist then bends the wire into a desired shape. Most commonly the wire is formed to match the arch form, or desired arch form of the teeth. The center part of the wire is curved to match the curvature of the alignment of the anterior (front) teeth. The two remaining sections of the wire are usually straight to conform to the arch form of the side and back teeth (bicuspid and

molars). So far the archwire shape has only been described in two dimensions. Using the mouth as a model, those dimensions are left to right and front to back. The third dimension is the vertical. In the mouth the term occlusal plane approximately represents the vertical dimension. An ideal occlusal plane is flat. An ideal archwire would be curved as described above and in the third dimension would be flat to represent the occlusal plane of the teeth. An orthodontist will lay the wire on a flat surface while forming the wire to make sure the wire is formed flat in this dimension. To return to "is curved on a flat plane" this means the wire is in the shape of a curve in the first two dimensions and flat in the third dimension. The term "curved on a flat plane" does not describe how this wire was formed.

Claims 7, 13 and 19 have been amended to help clarify this: line 4 ...longitudinal body is curved ~~on~~ with a flat occlusal plane..

In re claims 16, 22 and 28, White discloses the composition of the dental arch bar is stainless steel (col 1, ln 38).

White discloses in col. 1, line 38, "particular monolithic stainless steel archwires". Claims 16, 22 and 22 further define the invention and include all the limitations of their respective independent claims, making them allowable if the independent claims are allowable. (35 U.S.C. 112).

In re claims 19 and 25, White discloses the arch bar as previously described, as well as shows the wire is curved either upwards or downwards away from the flat plane in the direction that the occlusal plane of the teeth is to be moved (col 5, ln 54-59);

Col. 5, lines 54-59, "In the horizontal orthodontic archwire...." White discloses an archwire which fits within the slot of an orthodontic bracket unlike the present invention in claims 19 and 25, as amended, claims an archbar which is piggybacked on the cheek side of an installed archwire. White in Col. 1, lines 54-64, refers to Fig. 1A wherein the orthodontic archwire starts in the posterior at point 30 and proceeds upwards at points 24 and 26 where it proceeds downwards to point 22 which is better disclosed in Fig. 1B. Compare in the present invention the archbar 1 in Fig. 7 moves upwards moves upwards as it goes to the front 50. Also note in Fig. 7 there is an existing archwire 11 in the bracket slots. Fig. 9 in the present invention discloses the archbar going downward from back to front and note the archbar does not return upwards. Claim 19 in the present invention discloses the archbar bent downwards on one side and upwards on the opposite side. Claim 25 in the present invention discloses either both sides bent upwards to the front or both sides bent downwards to the front.

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance (Figures 2-3);

This is the same.

tying means for attaching the accessory arch bar to an orthodontic appliance, wherein a

wire ligature is used to attach the arch bar to an orthodontic bracket (col 7, ln 10-11);

This is the same.

and a cross-sectional diameter range that is between 0.020 inches to 0.60 inches (col 3, ln 47-49).

As discussed above, White discloses "a diameter of between 0.012" and 0.022". The novelty of the present invention is the wire sizes can exceed the range White discloses. In conclusion, White does not teach or suggest each and every element of claims 19 and 25. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

In re claims 21 and 27, White discloses the composition of the arch bar is comprised of metal compositions (col 3, ln 50-54).

This is the same. If the respective independent claims 21 and 27 refer to are allowable then 21 and 27 are allowable because they include the limitations of their relative independent claims. (35 U.S.C. 112).

5. Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Kesling (4,676,747). Kesling discloses using an accessory arch bar for placing orthodontic force upon the teeth

Kesling very specifically discloses torquing auxiliaries which are secured to the braces as in Col. 4, lines 29-33: ".....mounted in archwire slots of the brackets,(or) leave the main archwire alone in the archwire slot and mount the auxiliary in pins which are suitably interconnected to the brackets." The shape of the auxiliary is disclosed in Col. 4, lines 54-58: "The cross-sectional shape of the wire auxiliary,.....Preferably, this shape will be rectangular or square." The present invention is not capable of torquing the teeth. In Kesling the rectangular or square cross-sectional wire must engage a bracket slot of the same shape in a twisting or torquing manner in order to torque (push the roots towards the tongue) the teeth. The present invention does not engage the bracket slot as stated in claim 31, line 5: "placing the accessory arch bar adjacent to the cheek side of an orthodontic appliance".

consisting of forming a longitudinal arch bar into a pre-determined shape (Figure 2/Column 3, Lines 51-53);

The "form of an arcuate wire" in line 52 is similar but "for applying a torquing force" in lines 52-53 is not. The present invention does not require a wire rectangular or square in cross-section. The Kesling wire must be formed in a fourth dimension, twisting the wire axially (torquing).

placing the bar adjacent to the cheek side of an arch wire of an orthodontic appliance (Figure 3);

Fig. 3 discloses a Begg appliance which is probably no longer used anywhere in the world. The torquing wire 20P is disclosed placed between the bracket and the bracket base, not on the cheek side of the archwire as in the present invention.

and ligating the bar to an orthodontic appliance (col 5, ln 45-50).

Col. 5, lines 49-50, state: ".....connected to the bracket by means of a lock pin 26, as seen in Fig. 4." The present invention does not disclose a locking pin. The locking pin was used in the Begg appliance which is shown in Fig. 4 in Kesling. The Begg appliance is now obsolete. The modern orthodontic appliance is edgewise which does not use locking pins. In summary Kesling, for the above reasons, does not teach or suggest each and every element of claim 31. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the....claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I am responding with the following law in mind:

Prima Facie Obviousness

- (1) Some suggestion or motivation.....to modify.....combine.
- (2) Reasonable expectation of success.
- (3) Prior art must teach or suggest all the claim limitations MPEP § 2143.03.

MPEP § 2144.05

Prima Facie Obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention (In re Geisler).

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Teramoto in view of Moss (3,315,359). Teramoto discloses a dental arch bar as previously described,

As discussed above, Teramoto does not disclose each and every limitation of independent claim 1 in the present invention. Teramoto discloses a "wire" composed of two guide wires 1 connected to an orthodontic wire 2 between them (the orthodontic wire section 2 must fit within a .022" bracket slot). Teramoto discloses, as discussed above, a "wire" composed of two guide wires 1 connected with an orthodontic archwire 2 (the orthodontic archwire 2 must fit a .022" bracket slot).

but is silent as to having ends of said bar that are formed at a right angle to the bar's long axis and directed towards the teeth. Moss, however, teaches bending the ends of an orthodontic arch wire at right angles to form secure end sections (col 2, ln 57-60).

In the present invention Fig. 5C discloses the ends of the arch bar1 bent in at right angles 30. One purpose of the bend is the tie wire pictured won't slide off the end of the archwire 11. Moss's patent discloses as described in Col. 1, lines 53-55: ".....a bundle of very fine wires, each of which is capable of substantial resilient flexure.....". Lines 59-60 in Col. 2 state: ".....bent at right angles to form end sections as at 15a". Col. 2, lines 55-56 disclose: "The end sections 15a of the wire are affixed to the tubes 16 by means of soldering." This is disclosed in Figs. 3, 4, 5 and 6. This bundle of wires is very flexible and tends to bend somewhat like a rubber band. Once bent the flexible wire is not rigid enough to hold the bend; therefore, to secure it to the tube 16 it must be soldered to the tube 16. The end bend in the flexible wire does nothing to make the end of the wire more secure. The bend only functions to place the wire in proximity of the tube 16 so it may be soldered to it. The soldering is necessary for headgear, Fig. 6, force be transmitted to the flexible wire 15, described in Col.3, lines 58-64. Teramoto in view of Moss does not teach or suggest the bent wire end in claim 2 for the same reasons stated in the present invention. (Prior art must teach or suggest all the claim limitations MPEP § 2143.03.) As disclosed in Teramoto in Fig. 2 (a) the "wire" is not ligated to an installed archwire; therefore, a right angle bend at the end of the wire to prevent a tie from falling off is not taught or suggested. Under MPEP 2131.01 a multiple reference such as Moss must show the reference (the bend) is inherent, which it does not as stated above. Further, claim 2 refers to and includes all the limitations of claim 1; therefore, claim 2 is allowable if claim 1 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15).

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form right angles in the end sections of the arch bar in order to create secure end sections that do not irritate the inside portions of a patient's mouth as taught by Moss.

As discussed above, Teramoto in view of Moss does not suggest or motivate a person of ordinary skill in the art to modify or combine Teramoto and Moss to produce the present invention which is a single wire piggybacked to an orthodontic archwire and fitting outside the orthodontic bracket slots and turning the ends inwards to prevent the dislodging of a tie wire which ties the end of the archbar to an installed archwire. the right angle bend in claim 2 for the same reasons.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Teramoto. Teramoto discloses an arch bar as previously described, but fails to disclose the specific cross-sectional diameter of the arch bar is 0.027 inches. Although, Teramoto does disclose a cross-sectional diameter of the arch bar to be about 0.030 inches (col 3, ln 41-43).

As previously discussed Teramoto does not disclose a single continuous archbar. In Col. 3, lines 28-32 Teramoto discloses three wires: two guide wires 1, which you are referring to, and an anterior orthodontic wire 2. The orthodontic wire 2, as discussed previously, can only have a maximum size of .022" because it must fit within an orthodontic bracket slot which have a maximum size of .022".

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the cross-sectional diameter

0.027 inches since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205

USPQ 215 (CCPA 1980).

As discussed previously, the guide wire 1 you are referring only has to fulfill the function of being rigid, it does not move teeth. With this in mind it would not have been obvious for one of ordinary skill in the art to select a diameter of .027" relating to the movement of teeth because the Teramoto guide wire 1 is not intended to move teeth. As discussed above, Teramoto does not teach or suggest all the claim limitations of claim 5. (MPEP § 2143.03). Further, claim 5 refers to and includes all the limitations of claim 1; therefore, claim 5 is allowable if claim 1 is allowable. (If an independent claim is

nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15).

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Teramoto in view of Kelly (6,095,809). In re claim 6, Teramoto discloses a dental arch bar as previously described,

As discussed above, Teramoto discloses three separate wires. The guide wire 1 referred to in Teramoto in Col. 3, lines 41-43, only need be stiff, not flexible.

but is silent as to the composition of the bar being Ti beta 3. However, Kelly teaches an orthodontic arch bar that is comprised of beta-titaniums (col 5, ln 46-52).

Kelly does not teach an archbar. Kelly teaches an orthodontic archwire as stated in Col. 2, lines 28-29; "The present invention is directed to to an orthodontic archwire.....". Further, Col. 4, lines 25-26 discloses; "...the archwire is 0.025 inch by 0.0175 inch." This is an edgewise wire designed to. fit into an .018x.025 orthodontic bracket slot. The above reference (Col. 5, lanes 46-52) states in lines 52-53: "...titanium alloys such as beta-titanium." The present invention in claim 6, line 2, claims Ti beta 3 wire which is much more specific than beta-titanium. Note the 3 is part of the name in Ti beta 3. Prior art must teach or suggest all the claim limitations MPEP § 2143.03. Kelly does not teach the claim limitation of Ti beta 3. MPEP 2131.01 states the characteristic (Ti beta 3) shown in the extra cited reference must be inherent in the primary reference, which it is not. Ti beta 3 is a highly elastic wire, which does not fulfill the rigid requirement of the Teramoto guide wire 1.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to make the arch bar comprise of Ti beta 3 in order provide a sufficient stiffness and flexibility for the bar to operate as taught by Kelly.

As discussed above, Kelly does not disclose an arch bar, or specifically Ti beta 3; therefore, one having ordinary skill in the

art would not apply the stiffness and flexibility requirements of an archwire, which Kelly discloses, to the accessory archbar of the present invention wherein the archbar can exceed the diameter of the Kelly archwire because the wire in Kelly has a different function than the present invention, a person of reasonable skill in the art would not select Ti Beta 3 wire which is highly flexible. In summary 'Teramoto in view of Kelly does not does not teach or suggest the limitations of claim 6. {Prior art must teach or suggest all the claim limitations MPEP § 2143.03}.

In the present invention claim 6 includes the limitations of claim 5 which in turn refers to independent claim 1. If claim 1 is allowable then claim 6 is. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15)

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wool in view of Moss. In re claim 8, Wool discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are formed at a right angle to the bar's long axis and directed towards the teeth.

As discussed above, Wool discloses an archwire sized to fit within the slot of an orthodontic bracket, not an accessory archbar as in the present invention.

Moss, however, teaches bending the ends of an orthodontic arch wire at right angles to form secure end sections (col 2, ln 57-60).

As discussed above, the Moss right angle does not produce a more secure end section but allows the end of the wire to be in position to be soldered. The soldering makes the end of the wire secure.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form right angles in the end sections of the arch bar in order to create secure end sections that do not irritate the inside portions of a patient's mouth as taught by Moss.

Claim 8 of the present invention teaches the bend prevents dislodging of the end of the archbar from the tying means as disclosed in Fig. 5C. The prior art, Wool and Moss, do not teach or suggest the limitation of claim 8. {Prior art must teach or suggest all the claim limitations MPEP § 2143.03}. Further claim 8 includes the limitations of independent claim 7. If claim 7 is allowable then claim 8 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wool in view of Miura (5,017,133). In re claim 9, Wool discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are looped towards the teeth when placed on an orthodontic appliance.

Wool has been discussed above as disclosing an archwire, not a piggybacked accessory archbar as in the present invention.

Miura, however, teaches bending the ends of an orthodontic arch wire into loops (Figures 2-3) wherein the loop can encircle an orthodontic wire or bracket hook.

Figs. 2 and 3 in Miura disclose an archwire passing through the distal (back of the mouth) of a buccal tube. A buccal tube is sized to fit standard orthodontic archwires; but, is a tube. Note in Miura Col. 2, lines 17-20, "The distal ends (of the archwire) are the archwires are therefore deformable into shapes to prevent them from slipping through orthodontic appliances (buccal tube) when mounted thereto. The Miura invention is no more than heating the ends of highly resilient archwires to allow them to be bent. The posterior of an orthodontic appliance usually contain a tube to retain the archwire. The highly resilient wires tend to pull out of the tube during patient use. The posterior bend of the wire exiting the tube accomplishes prevents the archwire from pulling out of the tube. Miura doesn't disclose the bent wire hooking to a hook or encircling an orthodontic wire. The Miura wire is not an accessory wire, it is an archwire and the only wire disclosed in the drawings. The present invention archbar does not enter a bracket tube which can only hold a wire with a maximum size of .022".

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form loops in the end sections of the arch bar in order to secure said end sections and prevent the arch bar from slipping through the brackets as taught by Miura.

Wool in view of Miura does not teach or suggest the limitations of claim 9. (Prior art must teach or suggest all the claim limitations MPEP § 2143.03). Therefore, it would not be obvious to one having ordinary skill in the art at the time of the applicant's invention to form loops in the end sections of the archbar in order to secure the archbar to an installed archwire. Wool and Miura teach archwires which fit within bracket slots; therefore, don't need a loop to attach to themselves. Further claim 9 includes the limitations of independent claim 7. If claim 7 is allowable then claim 9 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

11. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wool

in view of Kelly (6,095,809). In re claims 10 and 12, Wool discloses a dental arch bar as previously described, but is silent as to the composition of the bar. Kelly, however, teaches an orthodontic arch bar that is comprised of metal compositions, including beta-titaniums (col 5, ln 46-52). Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to make the arch bar comprise of metal compositions (i.e. Ti beta 3) in order provide a sufficient stiffness for the bar to operate as taught by Kelly.

Both Wool and Kelly have been discussed above. As discussed, neither Kelly nor Wool teach anything involving stiffness necessary for an accessory bar which moves teeth due to the fact the accessory bars exceed the maximum cross-section of wires used in Wool and Kelly which is .022". Wool in view of Kelly does not teach or suggest each and every limitation of claims ten and 12. (Prior art must teach or suggest all the claim limitations MPEP § 2143.03).

Both claims 10 and 12 include all the limitations of independent claim 7 which they refer to. Assuming claim 7 is allowable, claims 10 and 12 are allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wool. Wool fails to disclose the specific cross-sectional diameter of the arch bar is 0.027 inches, though Wool does disclose a cross-sectional diameter of the arch bar to be 0.022 inches (col 6, ln 25).

As discussed above, the maximum orthodontic bracket slot size is 0.022". The Wool wire must fit into the slot; therefore cannot exceed 0.022" in cross-section. Wool does not teach the 0.027" limitation and does not suggest or motivate to a person of ordinary skill in the art to use a wire size which exceeds .022".

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the cross-sectional diameter 0.027 inches

Not only not obvious; but, impossible. This impossibility demonstrates the novelty of the present invention. Wool does not suggest or motivate a person of ordinary skill in the art in the art to make a wire .027" in diameter because archwires Wool discloses cannot exceed the size of a bracket slot.

since it has been held that discovering an optimum value of a result effective variable

involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As discussed above the optimum value for the wire diameter in Wool cannot exceed 0.022". A person of routine skill in the art would not know what to do with a 0.027" wire on a fixed orthodontic appliance. It would not have been obvious to a person having ordinary skills in the art when viewing White to use a wire which exceeded the diameter size that would fit into any known orthodontic appliance. (Prior art must teach or suggest all the claim limitations MPEP § 2143.03).

13. Claims 14, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Moss. In re claims 14, 20 and 26, White discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are formed at a right angle to the bar's long axis and directed towards the teeth.

White, as discussed above, involves an archwire with a wire maximum cross-section of 0.022" because the wire must fit within the slot of an orthodontic bracket.

Moss, however, teaches bending the ends of an orthodontic arch wire at right angles to form secure end sections (col 2, ln 57-60).

Moss teaches bending the end of a highly flexible wire in order to solder to a bar above it. As discussed above, the end of the Moss wire is made more secure by soldering the wire to the bar 16. The bend in the Moss wire does not make it more secure.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form right angles in the end sections of the arch bar in order to create secure end sections that do not irritate the inside portions of a patient's mouth as taught by Moss.

As discussed above, Moss did not teach either of these purposes. White discloses arch wires which fit a .022" bracket slot, Moss discloses an arch wire bent at a right angle in order to solder the end of the wire to another wire. A person of ordinary skill in the art would not view White in view of Moss and find they teach or suggest the claim limitations of claims 14, 20 and 26 wherein an accessory bar is piggybacked on an installed arch wire and the distal ends of the archbar are bent at a right angle in order to prevent a tie wire connecting the archbar to the arch wire from being dislodged. (Prior art must teach or suggest all limitations of the claim. MPEP § 2143.03. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494 (CCPA 1970).

Claim 14 includes all the limitations of independent claim 13 to which it refers to, as is true of claim 20 to claim 19 and claim 26 to 25. If claims 13, 19 and 25 are allowable claims 14, 20 and 26 are allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

14. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Miura. In re claim 15, White discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are looped towards the teeth when placed on an orthodontic appliance. Miura, however, teaches bending the ends of an orthodontic arch wire into loops (Figures 2-3) wherein the loop can encircle an orthodontic wire or bracket hook. Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form loops in the end sections of the arch bar in order to secure said end sections and prevent the arch bar from slipping through the brackets as taught by Miura.

White and Miura have both been extensively discussed above. Both White and Moss disclose archwires, not accessory arch bars as the present invention claims. The loop in the present invention does not prevent the accessory arch bar from slipping through a bracket because the archbar is not in a bracket, it is outside the bracket. Miura does not teach or suggest an arch bar which forms a loop around an archwire. A person of ordinary skill in the art viewing White and Mura would not find an accessory arch bar obvious; they don't even suggest an arch bar outside the confines of an orthodontic bracket.

Claim 15 includes all the limitations of independent claim 13. If claim 13 is allowable, claim 15 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. (*In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

15. Claims 17, 23 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over White. White discloses an arch bar as previously described but fails to disclose the specific cross-sectional diameter of the arch bar is 0.027 inches, though White does disclose a cross-sectional diameter of the arch bar to be between about 0.012 inches and

0.022 inches (col 3, ln 47-49). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the cross-sectional diameter 0.027 inches since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As discussed above, White discloses an archwire which cannot exceed 0.022" in diameter because it must fit within a bracket slot which is 0.022". Viewing White a person of ordinary skill in the art would not make a wire 0.027" in diameter because it would not fit the slot of standard orthodontic brackets. Claim 17 includes the limitations of independent claim 13, as is true of claim 23 to claim 19 and claim 29 to 25. If claims 13, 19 and 25 are allowable claims 17, 23 and 29 are allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

16. Claims 18, 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Kelly. In re claims 18, 24 and 30, White discloses a dental arch bar as previously described, but is silent as to the composition of the bar being Ti beta 3.

White does not disclose an arch bar. Col. 5, lines 54-59, "In the horizontal orthodontic archwire...." White discloses an archwire which fits within the slot of an orthodontic bracket unlike the present invention in claims 19 and 26, as amended, claims an archbar which is piggybacked on the cheek side of an installed archwire. White in Col. 1, lines 54-64, refers to Fig. 1A wherein the starts in the posterior at point 30 and proceeds upwards at points 24 and 26 where it proceeds downwards to point 22 which is better disclosed in Fig. 1B. Compare in the present invention the archbar 1 in Fig. 7 moves upwards moves upwards as it goes to the front 50. Also note in Fig. 7 there is an existing archwire 11 in the bracket slots. Fig. 9 in the present invention discloses the archbar going downward from back to front and note the archbar does not return upwards. Claim 19 in the present invention discloses the archbar bent downwards on one side and upwards on the opposite side. Claim 25 in the present invention discloses either both sides bent upwards to the front or both sides bent downwards to the front.

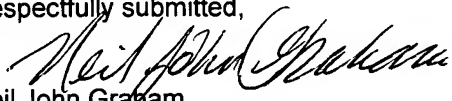
However, Kelly teaches an orthodontic arch bar that is comprised of beta-titaniums (col 5, ln 46-52). Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to make the arch bar comprise of Ti beta 3 in order provide a sufficient stiffness and flexibility for the bar to properly operate as taught by Kelly.

Kelly, as discussed above, discloses an arch wire, not an accessory arch bar. A person of ordinary

skill in the art would not view the stiffness and flexibility disclosed in Kelly which applies to an archwire which has a maximum diameter of 0.022" and find Ti beta 3 an obvious choice for a larger 0.027" wire.

Claims 18, 24 and 30 each include the limitations of the independent claims they refer to. Claim 18 refers to claim 17 which refers to claim 13, claim 24 refers to claim 23 which refers in turn to claim 19 and claim 29 which refers to claim 25. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. (*In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

Respectfully submitted,



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